

Exhibit I

Issues with the U.S. Army Corps of Engineers' February 2012 Vegetation Variance Request Policy and November 2011 Policy for Deployment and Implementation of System-Wide Improvement Frameworks

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How is the existing regional variance policy insufficient?

The USACE has been creating a revised Vegetation Variance Request Policy. It will become a policy guidance letter (PGL) and will revise the procedures included in the Engineering Technical Letter (ETL) 1110-2-571: "Guidelines for Landscape Planting and Vegetation Management at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures." It supersedes the existing regional variance policy and process from September 30, 2001 contained in Engineer Regulation (ER) and Engineer Pamphlet (EP) 500-1-1. It is not clear why the existing regional variance policy was insufficient and needed to be replaced.

Will previous variances still be valid?

The PGL contains several items whose impacts are not clear. It is unclear if prior variances will be allowed to be used to meet obligations per Assurance Agreements, but it appears these variances may not allow for continued eligibility for PL 84-99. It is also not clear if prior variances would be rescinded. Item 6.b.1. allows for sponsors with levees that have existing variances to seek new variances. Item 10.a. includes a statement about a one year deadline for levees with existing variances to submit a letter of intent to submit for a new variance or a system-wide improvement framework. Why is a new variance needed? Do sponsors need to apply for new approval for existing variances?

Variance acceptance procedure and standards are unclear.

The criteria for USACE acceptance of a variance and for allowable vegetation are strict, but the PGL states that some portions of the levee or situations are scrutinized to a greater level. An example of this language is contained in item 9.d.: "Any vegetation variance requests proposed for these areas will be carefully evaluated to ensure requirements in Paragraph 6 are met." What are these higher level criteria or scrutiny and why are they necessary? If it is shown that the levee integrity is maintained, why are other requirements necessary?

Initial vegetation variance eligibility of a levee for consideration is unclear.

There are portions of the PGL that are not consistent. Enclosure 3, item 4.a. states that a variance request should not include portions where there are reasonable alternatives and uses the requirement in 6.a. as an example. This appears to remove the possibility of using 6.b. and 6.c. requirements.

Prism size criteria are inconsistent, unclear, and unreasonable.

Enclosure 3, Figure 1 is unclear if the prism has a minimum size, and what this size is, or if the size is determined solely through geotechnical analysis. The lack of clarity arises because of the Enclosure 3, 3.a references meeting the requirements of EM 1110-2-1913, which has minimum levee dimensions. It is also not clear if the levee prism must meet underseepage requirements. Enclosure 3, Figure 1 and the definition provided for the prism suggests that it does not, but Enclosure 3, Submittal requirements, 4.b.(2) states that underseepage standards in ETL 1110-2-569 must be met. Is there a minimum prism size? If so, what is this size? Does the prism need to meet underseepage requirements (i.e., 0.5 maximum exit gradient at the landside toe of the prism)?

USACE has established design flood flows and design flood stages which, according to assurance agreements and the Operation and Maintenance Manual, the levees are supposed to be able to convey without failing. The PGL unreasonably ignores this fact and establishes the top of levee as the new standard for hydraulic loading for determining the minimum prism. Top of levee loading will typically be 3 feet or more higher than the loading the levees were ostensibly designed to convey, and will unreasonably require an unnecessarily larger prism.

In general, the PGL includes extensive application requirements, but the approval standards are open ended. Paragraph 4.b(2) states that the “USACE District may require a larger prism.” However, there is little discussion of what USACE may require beyond having a minimum root-free and tree-overthrow-pit-free prism that meets some geotechnical requirements and possibly some geometric requirements.

Extensive submittal requirements are included in the PGL and Enclosure 3 including cross sections of the levee and associated features, soil profiles, water velocity profiles, composite root systems, and other documentation that would require extensive research and investigations to complete. It is not possible to estimate the cost for developing the necessary documentation until it is clear what the prism requirements are. An estimated unit cost is presented below, based on assumed prism requirements.

The PGL is unreasonable as illustrated from the following concerns:

Recently the Sacramento Area Flood Control Agency sought to obtain a variance for vegetation on levees in the Natomas area as a part of enhancements to the levees in this area. They were able to obtain a limited variance but encountered many challenges in the process. Several engineering analyses and models were completed to show that the waterward vegetation did not have an impact on the stability of the levee. In the end, USACE deemed these engineer determinations as not reducing risk to a comfortable level and instead only allowing vegetation where roots did not penetrate the prism along overbuilt sections of the levee. Where the levees were not overbuilt and along the landward slope, USACE did not allow vegetation. The process of obtaining this limited variance took about 15,000 person hours and cost about \$300,000 for

a variance that covers limited portions of levees with a length of about 26 miles. The cost of complying with the variance is much higher and is not yet complete.

The Central Valley Flood Protection Plan states that most of the existing levees in California's Central Valley do not (and likely never did) meet the standards (with or without vegetation) included in Enclosure 3, Submittal Requirements, 4.b.(2). This section of the PGL states that the prism must meet standards in EM 1110-2-1913 and ETL 1110-2-569 including slope stability, seepage, and underseepage. The PGL precludes woody vegetation that would have no adverse impact or that would be beneficial for these levees. This approach would only make sense if it was a scientifically established fact that woody vegetation always increases risk. But the research has not supported this hypothesis. Sometimes woody vegetation can have no adverse impact or be beneficial. It is not appropriate to require woody vegetation removal if it has no adverse impact or is beneficial.

The PGL includes discussion of highly conservative minimum levee size requirements. These requirements appear to try to quantify conservative measures of levee performance, but it would make more sense and be easier to comply with specific performance requirements instead. The applicant can more easily determine what factors are of greater importance for a specific area. Again, the PGL includes significant discussion about the levee prism and possible root penetration. However, it is difficult to predict exactly how vegetation root systems will actually grow and recent research does not indicate that root systems cause more harm than benefit to levee embankments. A greater benefit to public safety and environmental regulation compliance would be obtained if the criteria for allowing vegetation were focused on engineering analyses of the impact vegetation has on the performance of the levee.

It would be expensive to gather the data necessary to complete the diagrams and evaluations Enclosure 3, Submittal Requirements, 4 and 5 require. If there is no minimum geometric prism requirement, and the prism needs to meet the requirements of ETL 1110-2-569, for the levees that might have a geotechnically adequate prism, based on DWR's experience in evaluating levees it may cost approximately \$100,000 per levee mile to determine the geotechnically adequate prism. After making that investment, the likely result would be that many levees would be ineligible for a variance based on having a root-free (or tree overturning pit-free) prism smaller than the geotechnically adequate prism. These levees would require further enhancements and/or vegetation removal at an additional cost estimated at more than \$7 million per mile.

Even if a variance was granted it would likely still require extensive removal of vegetation and the associated root systems. In some areas this would require degrading and re-compacting a substantial portion of the levee as well as extensive mitigation. The cost to remove vegetation system-wide to comply with possible variances would be approximately \$6.5 billion.

No programmatic environmental documents are being prepared by USACE. There is no way for local maintainers and non-federal sponsors to tier their documents and streamline them. This places a significant and unnecessary burden on applicants and resource agencies.

Separate vegetation variances would be required for different levee systems. For California's Central Valley State-federal Flood Control System, each of the 117 Project levee systems would require a separate variance. Each variance request would require a significant investment of time and money. Item 9.c. specifically excludes the use of a regional variance or a variance for all levees within a geographical area. This means that local maintaining agencies would have to negotiate the requirements for obtaining a vegetation variance. The challenges and costs to accomplish this that are outlined in this document would likely overwhelm almost all local maintaining agencies. Many do not have the resources to conduct the analyses and documentation; those that do have resources would likely consume multiple years' budgets to complete the process.

Forcing levee maintainers to use resources to obtain and comply with a vegetation variance would be devastating to the actual maintenance of the levees and would result in a significant decrease in public safety. Many local agencies simply do not have the resources required and those that do would be diverting it from other beneficial uses like normal levee maintenance. This money would be much better spent addressing issues that pose higher threats to the integrity of the levees.

What of ongoing research regarding impacts of woody vegetation to levees?

There is significant research that is being conducted by the USACE and by others, including in California, regarding the actual impacts of woody vegetation on the stability of levees. While this research is ongoing, preliminary results indicate that some types of vegetation may harm slope stability in some cases but enhance slope stability in other cases. Furthermore, the analysis performed by USACE in its research overstated the detrimental effect on levee stability by significantly overstating the wind loading on trees. In addition, research has also been conducted regarding burrowing mammal abundance related to the presence or absence of trees on levees. This study found that trees had a negative effect on the occurrence and abundance of burrowing mammals. These findings suggest that conversion of woodland habitats on levees to more open habitats like grassland will probably increase the habitat quality for burrowing mammals. Burrowing mammals in turn increase the potential threat to levee integrity. The criteria and requirements contained in this PGL do not take these research studies into account.

The proposed submittal process for new vegetation related science and technology is unclear.

The criteria for USACE acceptance of new vegetation science and technology contains items that are unclear and could be impossible to achieve. For example, a sentence in the first paragraph of 12 – *Submittal Process for New Vegetation Related Science and Technology* states:

"Documents submitted to USACE through this process must be submitted by the author(s) of the documents."

This requirement does not take into account a person or entity applying for a variance to USACE's vegetation policy who comes across some relevant new published literature that they believe should be considered by USACE.

- Why is it that the person who must argue the relevance and appropriate peer review of the research is the *author of the research*?
- What if the literature is written by someone who is too busy or not interested in assisting in this particular variance application?
- What if the author lives in another country, does not speak English, or is unfamiliar with USACE policies, or never considered USACE policies when writing their paper?
- What if the author is sick or deceased?

This submittal-by-author requirement places the burden of demonstrating the reliability and relevance of literature on someone who is potentially a completely disinterested third party. This does not make sense.

If this was not the intent of USACE, the language should be clarified to be clear that authors of previously peer-reviewed literature are not expected to be involved in the variance process.

Another concern with the submittal process is the following requirement stated in paragraph (2): "Documentation of the peer review demonstrating that a standard procedure for peer review was followed."

- What are going to be the standards for what constitutes adequate peer review or a 'Standard Procedure'?
- What will happen to literature that does not meet USACE standards?

There is a potential here for relevant literature that has already been peer-reviewed in highly rated science journals and proceedings to be taken off the table at a very early stage rather than considered and weighted appropriately.

- How does USACE plan to handle this?

The proposed SWIF policy is not a viable surrogate for a simplified regional variance policy.

USACE is also creating a policy for "Development and Implementation of System-Wide Improvement Frameworks (SWIFs)." This policy documents a voluntary program that allows for provisional extension of PL 84-99 eligibility while a plan for repairing and restoring a levee system to USACE standards. This includes the process of obtaining a vegetation variance. Unlike vegetation variances, SWIFs can be obtained for regions, not only specific systems. However, the proposed policy contains the following issues of concern for California.

The policy limits the timeframe to apply for and obtain acceptance for a SWIF to two years after USACE approval of the letter of intent, provided milestones described in the subsequent SWIF are met. It is not clear how detailed the SWIF must be, but two years may not be enough time to allow for adequate planning. Negotiation for acceptance of the proposed plan by resource agencies is placed on the applicant and there does not appear to be allowance for USACE assistance in obtaining their approvals. This process will likely take a significant amount of time.

If the SWIF is not accepted within the two years, it is not clear what options the applicant has. However, for California, a SWIF would likely include a plan for obtaining Vegetation Variances or a requirement to comply with ETL standards. In item 10 of the SWIF policy, “The end result of the SWIF process will be levees that meet USACE inspection standards...” It appears that if variances are not obtained or if a SWIF is not completed within the two years, USACE would simply require compliance with their current standards and would assign Unacceptable ratings, removing PL 84-99 eligibility for all systems that do not meet these standards.

In conclusion:

The proposed policies are unnecessarily restrictive and do not take into account current research or allow for engineer justification regarding the acceptability of vegetation on levee embankments. The PGL and recent experience implies that USACE will only accept some vegetation on the lower waterward slope that has root systems that do not penetrate the levee prism, subject to a minimum size but may be larger depending on geotechnical analyses. If this is the case, local interests would save a significant amount of time and money if USACE would state this. Existing and ongoing differences in conditions in various part of the United States are ignored. In California, these policies do not allow for a prioritization of needed enhancements to the flood control system and will needlessly remove the ability for local agencies to maintain the flood control system to standards. The effect of these policies will be detrimental to both public safety and the local environment. USACE should not issue these policies and instead, should engage local agencies to a greater degree in creating policies that work for the differing actual conditions that exist in the various regions of the United States.